NOTES 07: LINEAR REGRESSION
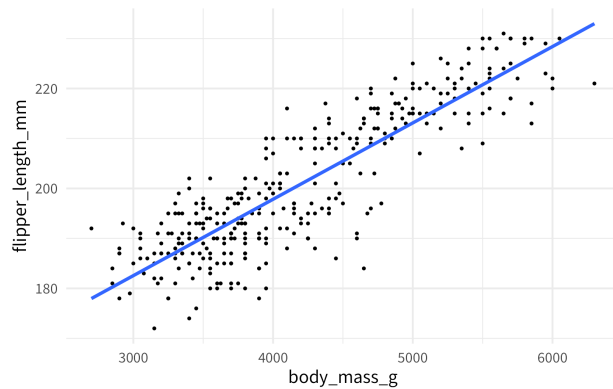
Stat 120 | Fall 2025
Prof Amanda Luby

$$\hat{\text{flipper\_length\_mm}} = 136.73 + 0.02(\text{body\_mass\_g}) \tag{1}$$

> **Observation**
>

> **Prediction**
>

> **Residual**
>

Example: I grab a penguin with a flipper length of 193mm and a body mass of 3475g. What is the observation, prediction, and residual in this case?

It can be helpful to look at a residual scatterplot when checking for linearity and outliers.

```
dives_lm = lm(DiveHeartRate ~ Duration, data = penguin_dives)
dives_aug = augment(dives_lm)
p1 = ggplot(dives_aug, aes(x = .fitted, y = .resid)) +
  geom_point(size = .5) +
  geom_hline(yintercept =0)
```

What would an ideal residual plot look like?
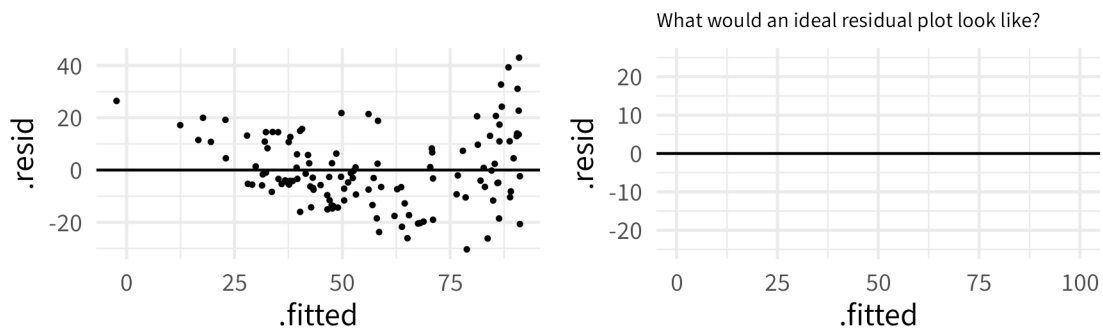
Below is the slope and intercept for the transformed model. Write out the linear regression equation and provide an in-context interpretation of the intercept and slope.

```
(Intercept)     Duration
 -0.007926    -0.001817
```

When do we do transformations?

Why is it important that we have a linear relationship?

What is the point of fitting a linear regression?